PATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY
(Chapter II of the Patent Cooperation Treaty)

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference	FOR FURTHER ACTION See Form PCT/IPEA/416	
83929-EH		
International application No.	International filing date *(day/month/year)*	Priority date *(day/month/year)*
PCT/NO 2003/000007	13.01.2003	17.01.2002
International Patent Classification (IPC) or national classification and IPC		
B63B 21/00		
Applicant		
Advanced Production and Loading AS et al		

1. This report is the international preliminary examination report, established by this International Preliminary Examining Authority under Article 35 and transmitted to the applicant according to Article 36.
2. This REPORT consists of a total of 5 sheets, including this cover sheet.
3. This report is also accompanied by ANNEXES, comprising:

   a. ☐ *(sent to the applicant and to the International Bureau)* a total of _____ sheets, as follows:

   ☐ sheets of the description, claims and/or drawings which have been amended and are the basis of this report and/or sheets containing rectifications authorized by this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions).

   ☐ sheets which supersede earlier sheets, but which this Authority considers contain an amendment that goes beyond the disclosure in the international application as filed, as indicated in item 4 of Box No. I and the Supplemental Box.

   b. ☐ *(sent to the International Bureau only)* a total of (indicate type and number of electronic carrier(s))

   _____, containing a sequence listing and/or tables related thereto, in computer readable form only, as indicated in the Supplemental Box Relating to Sequence Listing (see Section 802 of the Administrative Instructions).

4. This report contains indications relating to the following items:

☒	Box No. I	Basis of the report
☐	Box No. II	Priority
☐	Box No. III	Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
☐	Box No. IV	Lack of unity of invention
☒	Box No. V	Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
☐	Box No. VI	Certain documents cited
☐	Box No. VII	Certain defects in the international application
☐	Box No. VIII	Certain observations on the international application

Date of submission of the demand	Date of completion of this report
12.08.2003	16.04.2004
Name and mailing address of the IPEA/SE Patent- och registreringsverket Box 5055 S-102 42 STOCKHOLM Facsimile No. +46 8 667 72 88	Authorized officer Carl Frödeberg/EK Telephone No. +46 8 782 25 00

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.
PCT/[redacted]2003/000007

Box No. I Basis of the report

1. With regard to the **language**, this report is based on the international application in the language in which it was filed, unless otherwise indicated under this item.

☐ This report is based on a translation from the original language into the following language _____, which is the language of a translation furnished for the purposes of:

☐ international search (under Rules 12.3 and 23.1(b))
☐ publication of the international application (under Rule 12.4)
☐ international preliminary examination (under Rules 55.2 and/or 55.3)

2. With regard to the **elements** of the international application, this report is based on *(replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report)*:

☒ the international application as originally filed/furnished

☐ the description:

pages _____ as originally filed/furnished
pages* _____ received by this Authority on _____
pages* _____ received by this Authority on _____

☐ the claims:

pages _____ as originally filed/furnished
pages* _____ as amended (together with any statement) under Article 19
pages* _____ received by this Authority on _____
pages* _____ received by this Authority on _____

☐ the drawings:

pages _____ as originally filed/furnished
pages* _____ received by this Authority on _____
pages* _____ received by this Authority on _____

☐ a sequence listing and/or any related table(s) – see Supplemental Box Relating to Sequence Listing.

3. ☐ The amendments have resulted in the cancellation of:

☐ the description, pages _____
☐ the claims, Nos. _____
☐ the drawings, sheets/figs _____
☐ the sequence listing *(specify)*: _____
☐ any table(s) related to the sequence listing *(specify)*: _____

4. ☐ This report has been established as if (some of) the amendments annexed to this report and listed below had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).

☐ the description, pages _____
☐ the claims, Nos. _____
☐ the drawings, sheets/figs _____
☐ the sequence listing *(specify)*: _____
☐ any table(s) related to the sequence listing *(specify)*: _____

* *If item 4 applies, some or all of those sheets may be marked "superseded."*

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.
PCT/[redacted]2003/000007

Box No. V **Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**

1. Statement

Novelty (N)	Claims	1-6	YES
	Claims		NO
Inventive step (IS)	Claims		YES
	Claims	1-6	NO
Industrial applicability (IA)	Claims	1-6	YES
	Claims		NO

2. Citations and explanations (Rule 70.7)

The most relevant of the documents cited in the International Search Report:

D1: GB 1554881 A
D2: US 4516942 A

The claimed invention relates to an arrangement for mooring, loading and unloading of a vessel. The purpose of the invention is to solve the problem with insufficient position restoring forces for arrangements with a floating buoy connected with a chain or a connection arm to a foundation structure fastened to the seabed and the problem with critical components that are submerged in systems which are completely submerged.

D1, the closest prior art, discloses a mooring terminal for mooring of ships and for loading and unloading of the ships. The terminal comprises a vertical tower secured to a seabed anchor. A first end of a mooring arm (4) is pivotably connected to the seabed anchor. A surface buoy is arranged at the arm's other end and a second link is arranged at the surface buoy. The ship is connected to the second link. When a liquid product shall be loaded or unloaded a liquid product distribution unit in the form of a swivel is provided at the top of the tower.

D2 discloses a single point mooring apparatus for loading or discharging of a tanker. The single point mooring apparatus comprises a fixed mooring tower and at the top of the tower, above the water line, a yoke is attached to a turntable which is pivotably connected to the tower. A product swivel is also

.../...

Supplemental Box

In case the space in any of the preceding boxes is not sufficient.
Continuation of: Box V

mounted on the turntable and said product swivel rotatably connects the tanker to a submarine pipeline.

The arrangement for mooring, loading and unloading of a vessel according to claim 1 differs from the mooring terminal described in D1 since it is mentioned in claim 1 that a rotatably mounted outer tower links the yoke's rotation, which is placed below sea level, to a swivel, placed above sea level.

With knowledge of D1, a person skilled in the art has to solve the problem of linking the yoke's rotation, i.e. the rotation of the moored ship, to the swivel's rotation.

In D1 the swivel will rotate because the hose between the swivel and the ship pulls the swivel around. But to link the rotation of the swivel with the rotation of the yoke, i.e. the rotation of the moored ship, must be considered obvious to a person skilled in the art. Especially, since it, for example, can be seen in D2 that the swivel's rotation is connected to the rotation of the yoke via the turntable. And when linking the yoke, when it is located below sea level, with the swivel, when it is located above the surface, it is logical to use some kind of outer tube or tower. Therefore, the subject matter of claim 1 is not considered to involve an inventive step.

The mooring arm in D1 is connected to the tower near the seabed. Therefore, the subject matter of claim 2 is not considered to involve an inventive step.

It is not mentioned in D1 that the extension of the longitudinal axis of the mooring arm penetrates the stationary anchoring in the sea bed. However, as can be seen in the figures in D1 the longitudinal axis of the mooring arm penetrates, or at least almost penetrates, the stationary anchoring in the sea bed. Therefore, the subject matter of claim 3 is not considered to involve an inventive step.

The bearings of the rotatable fastening of the mooring arm to the tower in D1 are not specified in the same manner in D1 as they are in claim 4. However, to use one main radial bearing in conjunction with two axial bearings is well known from

.../...

Supplemental Box

In case the space in any of the preceding boxes is not sufficient.
Continuation of: Box V

before. In view of that, it must be considered obvious to a person skilled in the art to also use one main radial bearing in conjunction with two axial bearings for the rotatable fastening of the mooring arm to the tower in D1. Therefore, the subject matter of claim 4 is not considered to involve an inventive step.

The mooring arm in D1 is not formed as a Δ. However, the second link in D1 is formed as a Δ. To also form the mooring arm as a Δ and provide the buoy between the outer ends must be considered obvious to a person skilled in the art. Therefore, the subject matter of claim 5 is not considered to involve an inventive step.

The mooring arm in D1 is rotatably mounted on a bearing assembly (5) that is rotatable around the tower. A second link is rotatably mounted on the surface buoy which results in that the ship is moveable around three axes in relation to the tower. This is not the same solution as in claim 6.However, in D2 the yoke is rotatably mounted on a turntable (41), which is rotatable around the tower and the yoke has a second rotatable pin (72) for rotation around the yoke's longitudinal axis. The result is a yoke that is movable around three axes in the same way as in claim 6. In view of that, it must be considered obvious to a person skilled in the art to also provide the mooring arm in D1 with the same solution and therefore, the subject matter of claim 6 is not considered to involve an inventive step.